American Society of Mammalogists

TCNs & PENS: planning and organizing your digitization projects

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Coordinating Center for Advancing Digitization of Biodiversity Collections (ADBC)

ADBC: $100 million over 10 years from U.S. National Science Foundation
Advancing Digitization of Biodiversity Collections

• Facilitate use of biodiversity data to address environmental and economic challenges
  ▪ Researchers
  ▪ Educators
  ▪ General public, citizen scientists
  ▪ Policy-makers

• Develop efficient and effective digitization standards and workflows

• Respond to cyberinfrastructure needs

• Develop research, education and outreach collaborations

• Plan for long-term sustainability of the national digitization effort
13 (15) Thematic Collections Networks (TCNs)

- **InvertNet**: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification (*Illinois Natural History Survey, University of Illinois*).

- **Plants, Herbivores, and Parasitoids**: A Model System for the Study of Tri-Trophic Associations (*American Museum of Natural History*).

- **North American Lichens and Bryophytes**: Sensitive Indicators of Environmental Quality and Change (*University of Wisconsin Madison*).

- **Digitizing Fossils** to Enable New Syntheses in Biogeography-Creating a PALEONICHES-TCN (*University of Kansas*).

- **The Macrofungi Collection Consortium**: Unlocking a Biodiversity Resource for Understanding Biotic Interactions, Nutrient Cycling and Human Affairs (*New York Botanical Garden*).

- **Mobilizing New England Vascular Plant** Specimen Data to Track Environmental Change (*Yale University*).

- **Southwest Collections of Arthropods Network (SCAN)**: A Model for Collections Digitization to Promote Taxonomic and Ecological Research (*Northern Arizona University*).

- **The Macroalgal Herbarium** Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment (*University of New Hampshire*).

- **Developing a Centralized Digital Archive of Vouchered Animal Communication Signals** (*Cornell University*).

- **Fossil Insect Collaborative**: A Deep-Time Approach to Studying Diversification and Response to Environmental Change (*University of Colorado at Boulder*).

- **Great Lakes Invasives**: Documenting the Occurrence through Space and Time of Aquatic Non-indigenous Fish, Mollusks, Algae, and Plants Threatening North America's Great Lakes (*University of Wisconsin Madison*).

- **InvertEBase**: Reaching Back to See the Future: Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts (*Field Museum of Natural History*).

- **The Key to the Cabinets**: Building and Sustaining a Research Database for a Global Biodiversity Hotspot (*Appalachian State University*).
13 TCNS: 200 institutions in 50 states
13 (15) Thematic Collections Networks (TCNs)

- **InvertNet**: (*Illinois Natural History Survey, University of Illinois*) *Arthropods, mostly insects*
- **Plants, Herbivores, and Parasitoids**: (*American Museum of Natural History*) *Vascular plants, insects*
- **North American Lichens and Bryophytes**: (*University of Wisconsin Madison*) *Lichens and Bryophytes*
- **Digitizing Fossils ... PALEONICHES**: (*University of Kansas*) *Fossils*
- **The Macrofungi Collection Consortium**: (*New York Botanical Garden*) *Fungi*
- **Mobilizing New England Vascular Plants**: (*Yale University*) *Vascular Plants*
- **Southwest Collections of Arthropods Network (SCAN)**: (*Northern Arizona University*) *Arthropods, mostly insects*
- **The Macroalgal Herbarium Consortium**: (*University of New Hampshire*) *Algae*
- **Digital Archive of Animal Communication Signals**: (*Cornell University*) *Audio recordings (mostly birds)*
- **Fossil Insect Collaborative**: (*University of Colorado at Boulder*) *Fossils*
- **Great Lakes Invasives**: (*University of Wisconsin Madison*) *Vascular plants, fishes*
- **InvertEBase**: Reaching Back to See the Future: (*Field Museum of Natural History*) *Arthropods, mostly insects*
- **The Key to the Cabinets**: (*Appalachian State University*) *Vascular plants*
13 (15) Thematic Collections Networks (TCNs)

Vascular plants: 4

Arthropods: 4

Non-vascular plants: 2

Fungi: 1

Fossils: 2

Vertebrates: 2 (audio; fishes only)
13 (15) Thematic Collections Networks (TCNs)

Vascular plants: 4

Arthropods: 4

Non-vascular plants: 2

Fungi: 1 -> 2

Fossils: 2 -> 3

Vertebrates: 2 (audio; fishes only)
Advancing Digitization of Biodiversity Collections (ADBC)

Solicitation 15-576

ADBC was developed in response to the Network Integrated Biocollections Alliance (NIBA) Strategic Plan (digbiocol.wordpress.com/brochure/) for a sustained program to digitize information in the nation’s vast biodiversity collections.

Digitization is the process of capturing and storing digital information about physical objects. This information includes text from labels, catalogs and field books, high-resolution digital photographs, sound and video, and 3-D models created from a variety of sources.
Biodiversity Collections

The single largest source of information on biological diversity (outside nature)

1,300 – 1,500 collections in U.S.A.

1 billion specimens in USA

3 billion specimens globally
Biodiversity

Collections: Specimens, Images, DNA

Environmental Policy
Management, Use, Protection

New Discoveries
Understanding
Appreciation

billions of specimens

Research
Education
Outreach
Biodiversity

Collections: Specimens, Images, DNA

Benefits

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Benefits
Problem:
The data in biodiversity collections are inaccessible to most potential users
Biodiversity

Collections: Specimens, Images, DNA

Environmental Policy
Management, Use, Protection

New Discoveries

Understanding

Appreciation

Research
Education
Outreach
The goal of **ADBC** is to remove this inaccessibility through **digitization**: putting information online so that researchers, educators, students, natural resource managers, environmentalists, and policymakers have access.

$100$ million over $10$ years to digitize specimen-based data in non-federal U.S. collections
Biodiversity

Collections: Specimens, Images, DNA

Digitization
- Databasing
- Georeferencing
- Imaging

Environmental Policy
- Management, Use, Appreciation, Protection

New Discoveries

Understanding

Appreciation

Research

Education

Outreach
Collections: Specimens, Images, DNA

Digitization
- Databasing
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New Discoveries
Understanding
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Collections: Specimens, Images, DNA

Digitization

- Databasing
- Georeferencing
- Imaging

Vertebrate collections

- far ahead of most
- variable
- minimal

New Discoveries

Understanding

Appreciation

Research

Education

Outreach
Advancing Digitization of Biodiversity Collections

Funds
‘Thematic Collections Networks’ or TCNs – groups of institutions that digitize data organized around a research question
(climate change, invasive species, agricultural pests, etc.)
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What are the likely impacts of climate change?
What are the effects of invasive species?
What are the effects of landscape modification?
What is the history of life on Earth?
How are species distributed in geographical, ecological, and temporal space?
What factors lead to speciation, dispersal, and extinction?
What information is needed for effective conservation strategies?
How are specific genotypes distributed in geographical and ecological space?
How do species (and genotypes) covary across the landscape, and are those covariances likely to persist into the future?
How are ecologically significant traits distributed geographically?
What is the extent of phylogenetic constraints on ecological niche evolution?
What connections between biodiversity and ecosystem services contribute to human welfare?
Advancing Digitization of Biodiversity Collections

Funds

‘Thematic Collections Networks’ or TCNs

- Full Proposal Deadline: October 09, 2015
- $10,000,000 available in ADBC
- ~ $7,000,000 for TCNs and PENs
- Each year 2-4 TCNs are funded
Advancing Digitization of Biodiversity Collections

Funds
‘Partners to Existing Networks’ or PENs

- Full Proposal Deadline: October 09, 2015
- Partner with an existing TCN
- awards for 2 to 3 years with a maximum request of $175,000
Collections in Support of Biological Research (CSBR)

Funding for:

1) improvements to secure and organize collections that are significant to the NSF BIO-funded research community;

2) to secure collections-related data for sustained, accurate, and efficient accessibility to the biological research community;

3) to transfer ownership of collections.
Collections in Support of Biological Research (CSBR)

Full Proposal Deadline: September 10, 2015

Average award ca. $200,000-$300,000